PUBLIC ABSTRACT

Applicant (primary) name: Ohio University

Applicant=s address: 1 Riverside Drive, Athens, Ohio 45701
Street City State Zipcode

Team Members (if any):
(listing represents only participants at time of application, not necessarily final team membership)

American Electric Power
American Air Liquide
Ohio Coal Development Office
Gas Technology Institute
Battelle
McDermott Technology

(Use continuation sheet if needed.)

Proposal Title: The Hocking Valley Advanced Coal Gasification Combined Heat and Power Facility

Commercial Application: XX New Facilities **9** Existing Facilities

9 Other, Specify: _____

Technology Type: U-GAS and Fuel Cell

Estimated total cost of project:
(May not represent final negotiated costs.)

Total Estimated Cost: $133,950,016

Estimated DOE Share: $ 66,975,008

Estimated Private Share: $ 66,975,008

PUBLIC ABSTRACT (cont=d)

Anticipated Project Site(s): Ohio University, Athens, OH 45701
Location (city, county, etc.) State Zipcode

Location (city, county, etc.) State Zipcode

Location (city, county, etc.) State Zipcode

Type of coal to be used: _____ _____
Primary Alternate (if any)

Size or scale of project: 300% increase in coal use by University
Tons of coal/day input
And/or
_____ Megawatts, Barrels per day, etc.
Other (if necessary)

Duration of proposed project: 96
(From date of award) (Months)

PRIMARY CONTACT:

For additional information, interested parties should contact: Name: Thea R. Arocho

Position: Associate Director, Research and Sponsored Programs

Telephone Number: (740)593-2856

Company: Ohio University

e-mail address: Arocho@ohio.edu

Address: _____

City State Zipcode

Alternative Contact:

Name: _____

Position: _____

Telephone Number: ( )

Company: _____

e-mail address: _____

Address: _____

City State Zipcode

PUBLIC ABSTRACT (cont=d)

Brief description of project:

Ohio University, located in the heartland of America's Midwest high-sulfur coal fields, has assembled a team of industry leaders to demonstrate the capability and accelerate the commercial deployment of advanced coal-based combined cycle gasification and fuel cell technology to reduce costs for industrial/commercial scale facilities using coal for combined heat and power systems. The partners of the Hocking Valley Advanced Coal Gasification Combined Heat and Power (ADC-CHP) Facility Project include: Ohio University, American Electric Power, Gas Technology Institute, McDermott Technology Inc. and American Air Liquide. The State of Ohio Coal Development Office will be a co-funder for this project; Battelle will participate as a technical advisor.

To produce both electricity and steam for the Ohio University campus, coal will be gasified using a pressurized oxygen-blown, fluidized-bed gasification system known as U-GAS ®. The technology reduces the hydrocarbons in the coal to CO and H2, commonly called synthesis gas.

Particulates and sulfur gases with the syngas will be removed before combustion of the syngas in a gas turbine. The gas turbine-generator set produces about 14 MW of power. A 50 kWe planar solid oxide fuel cell will be installed and operated first with natural gas, with plans for conversion and operation on synthesis gas later. The process heat from both conversion devices can be used to produce steam, which will drive a 5 MW steam turbine to produce additional electricity before being used in the campus district heating and cooling system. The preliminary design for the proposed Hocking Valley ACG-CHP Facility would net 14 MW of electrical power generation, while supplying in excess of 100,000 pounds per hour of steam.

The Hocking Valley ACG-CHP Facility addresses many of the goals and objectives of the Clean Coal Power Initiative. As a combined heat and power system using coal, it offers the potential to achieve a greater level of overall energy efficiency, lower energy costs, and reduce carbon emissions. The gasification system use 100% coal and will increase the University's coal use by nearly 300% in providing heat and power to the campus, while significantly reducing the emissions of SO2 and NOx compared to Ohio University's current stoker-boilers. By using oxygen-blown gasification, carbon dioxide will be a richer fraction of the gas stream, eliminating the cost of nitrogen separation in the hot flue gas, making potential capture and later sequestration possible. By incorporating a fuel cell into the system, the potential for high-efficiency, low-cost heat power may be realized.

Further, the Hocking Valley ACG-CHP Facility brings together industrial and academic organizations that are significantly involved with development of future power generation technology necessary to meet the goals of the Department of Energy's Vision 21 program. Such teaming is synergistic with other CCPI objectives, including the opportunity to install and test new and advanced instrumentation, both on line and in the synthesis gas slipstream, the opportunity to demonstrate new design features of modern small steam turbines, and other commercial opportunities including aero-derivative or other advanced turbines.

The use of coal in larger "distributed" power generation, such as combined heat and power, also serves to address the President's objectives of promoting national security. By using coal instead of natural gas, which

currently is the dominant fuel for this application, not only could long-term energy prices be stabilized and reduced, but also the increase in fuel diversity should make upsets in fuel supplies less likely. Further, by increasing the use of distributed power, efficiency is improved by elimination of electrical transmission losses. And finally, the use of distributed combined heat and power systems improves the security of the electric power grid through reduction in the dependence on the large centralized station for all electrical power.

The Hocking Valley ACG-CHP Facility will serve as a nearly ideal demonstration for a potentially large market currently untapped by coal-fired systems. Throughout the United States, many large industrial, academic, and municipal complexes are heated or supplied with process steam using coal-fired boilers. Without cost-effective alternatives, as these boilers age beyond economic usefulness, they are being replaced with gas “package” boilers and power systems.

The real need to reduce and stabilize fuel costs, as well as produce electricity at the point of demand, have created a market for small-scale combined cycle combined heat and power systems. A demonstration of a cost-effective coal-based system is critical to the expansion of coal into this important energy market.